

# Interaction between creatinine and sulfonated derivatives of cobalt phthalocyanine

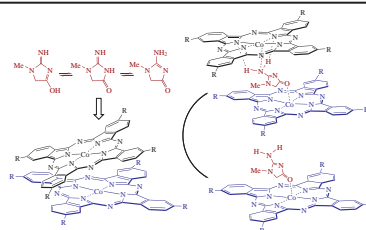
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**Sulfonated derivatives of cobalt phthalocyanine strongly fix the creatinine (2-amino-1-methyl-1*H*-imidazol-4-ol) thus forming ordered dimeric structures. Such bonding may be used to create materials for sorption of creatinine from the solutions and to form direct liquid-phase systems based on metal phthalocyanines.**



The methods of supramolecular chemistry of metallophthalocyanines (MPc) allow one to obtain liquid-phase systems possessing biological and catalytic activity.<sup>1,2</sup> Especially promising areas of research are the creation of transport systems<sup>3</sup> for the targeted delivery of medicines and purification of biological fluids from toxins<sup>4</sup> and molecular magnets.<sup>5</sup> In this context, the

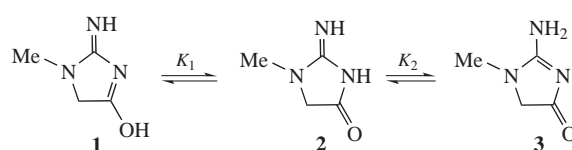
problems of MPc self-organization in solutions,<sup>6</sup> on the surface of solid-phase supports<sup>7</sup> and their interactions with various biomolecules<sup>8,9</sup> are to be solved. It is necessary to provide transparency of the metal in the composition of MPc for coordination interaction in the course of the material formation. In our opinion, one more important point is intermolecular interaction of the MPc with compounds contained in human blood and other biological fluids and organs. Such interactions can often have an unpredictable impact on the macrosystem and dramatically change its properties.

Here we present the results of our study of the intermolecular interaction between creatinine (2-amino-1-methyl-1*H*-imidazol-4-ol) and cobalt complexes of sulfonated phthalocyanines in water media. Creatinine is involved in energy metabolism,<sup>10</sup> muscular and other tissues and is always present in human blood. The presence of anchoring groups in the macrocycle makes it possible to obtain hybrid materials based on polymeric matrix.<sup>11,12</sup> High degree of creatinine bonding by Co<sup>II</sup> porphyrins<sup>13</sup> and their structural analogues combined with possibility of chemical anchoring on the polymers are promising for creating the materials for blood dialysis.

It was shown previously<sup>14–16</sup> that CoTSPcI–CoTSPcV<sup>†</sup> molecules in water media are associated and form H- and J-aggregates.

At the same time, introduction of polydentate ligands with equal coordination centers into the system leads to the transformation of the macrocycle dimeric structures and formation of close-packed sandwich-type dimers.<sup>16–18</sup> In case of ligands having different reaction centers, the variety of specified type associates with changing thermodynamic stability is increased.

Creatinine molecule may be presented as a mixture of three tautomeric forms (**1–3**) due to migration of the proton.



<sup>†</sup> For synthesis and characteristics of cobalt phthalocyanines, see Online Supplementary Materials.

